Pushing the Envelope			
2008 Mathematics			
Core Curriculum Content Standards			
New Jersey Mathematics			
Grade 5			
Activity/Lesson	**State**	**Standards**	
Types of Engines (pgs. 11-23)	NJ	MA.5.4.5 E.1.c	Create and use representations to organize, record, and communicate mathematical ideas: Symbolic representations (e.g., a formula)
Chemistry (pgs. 25-41)	NJ	MA.5.4.5 E.1.c	Create and use representations to organize, record, and communicate mathematical ideas: Symbolic representations (e.g., a formula)
Physics and Math (pgs. 43-63)	NJ	MA.5.4.3.5 C.1.a	Use number sentences to model situations: Using variables to represent unknown quantities
Physics and Math (pgs. 43-63)	NJ	MA.5.4.3.5 C.2.b	Draw freehand sketches of graphs that model real phenomena and use such graphs to predict and interpret events: Rates of change (e.g., when is plant growing slowly/rapidly, when is temperature dropping most rapidly/slowly)
Physics and Math (pgs. 43-63)	NJ	MA.5.4.5 E.1.c	Create and use representations to organize, record, and communicate mathematical ideas: Symbolic representations (e.g., a formula)
Rocket Activity (pgs. 69-75)	NJ	MA.5.4.5 E.1.c	Create and use representations to organize, record, and communicate mathematical ideas: Symbolic representations (e.g., a formula)
Pushing the Envelope			
2008 Mathematics			
Core Curriculum Content Standards			
New Jersey Mathematics			
Grade 6			
Activity/Lesson	**State**	**Standards**	
Types of Engines (pgs. 11-23)	NJ	MA.6.4.3.6 B.1	Describe the general behavior of functions given by formulas or verbal rules (e.g., graph to determine whether increasing or decreasing, linear or not).
Types of Engines (pgs. 11-23)	NJ	MA.6.4.5 E.1.c	Create and use representations to organize, record, and communicate mathematical ideas: Symbolic representations (e.g., a formula)
Chemistry (pgs. 25-41)	NJ	MA.6.4.3.6 B.1	Describe the general behavior of functions given by formulas or verbal rules (e.g., graph to determine whether increasing or decreasing, linear or not).
Chemistry (pgs. 25-41)	NJ	MA.6.4.5 E.1.c	Create and use representations to organize, record, and communicate mathematical ideas: Symbolic representations (e.g., a formula)
Physics and Math (pgs. 43-63)	NJ	MA.6.4.1.6 A.4	Explore the use of ratios and proportions in a variety of situations.

Physics and Math (pgs. 43-63)	NJ	MA.6.4.3.6 A.1.a	Recognize, describe, extend, and create patterns involving whole numbers and understand descriptions using tables, verbal rules, simple equations, and graphs
Physics and Math (pgs. 43-63)	NJ	MA.6.4.3.6 B.1	Describe the general behavior of functions given by formulas or verbal rules (e.g., graph to determine whether increasing or decreasing, linear or not).
Physics and Math (pgs. 43-63)	NJ	MA.6.4.3.6 C.1.a	Use number sentences to model situations: Using variables to represent unknown quantities
Physics and Math (pgs. 43-63)	NJ	MA.6.4.3.6 C.2.c	Draw freehand sketches of graphs that model real phenomena and use such graphs to predict and interpret events: Rates of change (e.g., when is plant growing slowly/rapidly, when is temperature dropping most rapidly/slowly)
Physics and Math (pgs. 43-63)	NJ	MA.6.4.5 E.1.c	Create and use representations to organize, record, and communicate mathematical ideas: Symbolic representations (e.g., a formula)
Rocket Activity (pgs. 69-75)	NJ	MA.6.4.3.6 B.1	Describe the general behavior of functions given by formulas or verbal rules (e.g., graph to determine whether increasing or decreasing, linear or not).
Rocket Activity (pgs. 69-75)	NJ	MA.6.4.5 E.1.c	Create and use representations to organize, record, and communicate mathematical ideas: Symbolic representations (e.g., a formula)
Pushing the Envelope			
2008 Mathematics			
Core Curriculum Content Standards			
New Jersey Mathematics			
Grade 7			
Activity/Lesson	**State**	**Standards**	
Types of Engines (pgs. 11-23)	NJ	MA.7.4.3.7 D.3.b	Create, evaluate, and simplify algebraic expressions involving variables including substitution of a number for a variable
Types of Engines (pgs. 11-23)	NJ	MA.7.4.5 E.1.c	Create and use representations to organize, record, and communicate mathematical ideas: Symbolic representations (e.g., a formula)
Chemistry (pgs. 25-41)	NJ	MA.7.4.3.7 D.3.b	Create, evaluate, and simplify algebraic expressions involving variables including substitution of a number for a variable
Chemistry (pgs. 25-41)	NJ	MA.7.4.5 E.1.c	Create and use representations to organize, record, and communicate mathematical ideas: Symbolic representations (e.g., a formula)
Physics and Math (pgs. 43-63)	NJ	MA.7.4.1.7 A.3	Understand and use ratios, proportions, and percents (including percents greater than 100 and less than 1) in a variety of situations.
Physics and Math (pgs. 43-63)	NJ	MA.7.4.2.7 A.2.a	Understand and apply the concept of similarity by using proportions to find missing measures
Physics and Math (pgs. 43-63)	NJ	MA.7.4.3.7 A.1.a	Descriptions using tables, verbal and symbolic rules, graphs, simple equations or expressions

Physics and Math (pgs. 43-63)	NJ	MA.7.4.3.7 D.3.b	Create, evaluate, and simplify algebraic expressions involving variables including substitution of a number for a variable
Physics and Math (pgs. 43-63)	NJ	MA.7.4.5 E.1.c	Create and use representations to organize, record, and communicate mathematical ideas: Symbolic representations (e.g., a formula)
Rocket Activity (pgs. 69-75)	NJ	MA.7.4.5 E.1.c	Create and use representations to organize, record, and communicate mathematical ideas: Symbolic representations (e.g., a formula)
Pushing the Envelope			
2008 Mathematics			
Core Curriculum Content Standards			
New Jersey Mathematics			
Grade 8			
Activity/Lesson	**State**	**Standards**	
Types of Engines (pgs. 11-23)	NJ	MA.8.4.3.8 D.4.c	Create, evaluate, and simplify algebraic expressions involving variables including substitution of a number for a variable
Types of Engines (pgs. 11-23)	NJ	MA.8.4.5 E.1.c	Create and use representations to organize, record, and communicate mathematical ideas: Symbolic representations (e.g., a formula)
Chemistry (pgs. 25-41)	NJ	MA.8.4.2.8 D.6	Solve problems that involve compound measurement units, such as speed (miles per hour), air pressure (pounds per square inch), and population density (persons per square mile).
Chemistry (pgs. 25-41)	NJ	MA.8.4.3.8 D.4.c	Create, evaluate, and simplify algebraic expressions involving variables including substitution of a number for a variable
Chemistry (pgs. 25-41)	NJ	MA.8.4.5 E.1.c	Create and use representations to organize, record, and communicate mathematical ideas: Symbolic representations (e.g., a formula)
Physics and Math (pgs. 43-63)	NJ	MA.8.4.1.8 A.3	Understand and use ratios, rates, proportions, and percents (including percents greater than 100 and less than 1) in a variety of situations.
Physics and Math (pgs. 43-63)	NJ	MA.8.4.2.8 A.4.a	Understand and apply the concept of similarity by using proportions to find missing measures
Physics and Math (pgs. 43-63)	NJ	MA.8.4.3.8 A.1.a	Descriptions using tables, verbal and symbolic rules, graphs, simple equations or expressions
Physics and Math (pgs. 43-63)	NJ	MA.8.4.3.8 B.2	Recognize and describe the difference between linear and exponential growth, using tables, graphs, and equations.
Physics and Math (pgs. 43-63)	NJ	MA.8.4.3.8 D.4.c	Create, evaluate, and simplify algebraic expressions involving variables including substitution of a number for a variable
Physics and Math (pgs. 43-63)	NJ	MA.8.4.4.8 B.1	Interpret probabilities as ratios, percents, and decimals.
Physics and Math (pgs. 43-63)	NJ	MA.8.4.5 E.1.c	Create and use representations to organize, record, and communicate mathematical ideas: Symbolic representations (e.g., a formula)

Rocket Activity (pgs. 69-75)	NJ	MA.8.4.5 E.1.c	Create and use representations to organize, record, and communicate mathematical ideas: Symbolic representations (e.g., a formula)
Pushing the Envelope			
2008 Mathematics			
Core Curriculum Content Standards			
New Jersey Mathematics			
Grade 12			
Activity/Lesson	**State**	**Standards**	
Types of Engines (pgs. 11-23)	NJ	MA.12.4.3.12 A.1.1	Use models and algebraic formulas to represent and analyze sequences and series: Explicit formulas for nth terms
Types of Engines (pgs. 11-23)	NJ	MA.12.4.3.12 A.1.2	Use models and algebraic formulas to represent and analyze sequences and series: Sums of finite arithmetic series
Types of Engines (pgs. 11-23)	NJ	MA.12.4.3.12 A.1.3	Use models and algebraic formulas to represent and analyze sequences and series: Sums of finite and infinite geometric series
Types of Engines (pgs. 11-23)	NJ	MA.12.4.5 E.1.3	Create and use representations to organize, record, and communicate mathematical ideas: Symbolic representations (e.g., a formula)
Chemistry (pgs. 25-41)	NJ	MA.12.4.2.12 D.2.2	Finding the interval in which a computed measure (e.g., area or volume) lies, given the degree of precision of linear measurements
Chemistry (pgs. 25-41)	NJ	MA.12.4.2.12 E.2.2	Finding which shape has minimal (or maximal) area, perimeter, volume, or surface area under given conditions using graphing calculators, dynamic geometric software, and/or spreadsheets
Chemistry (pgs. 25-41)	NJ	MA.12.4.2.12 E.2.3	Use a variety of strategies to determine perimeter and area of plane figures and surface area and volume of 3D figures: Estimation of area, perimeter, volume, and surface area
Chemistry (pgs. 25-41)	NJ	MA.12.4.3.12 A.1.1	Use models and algebraic formulas to represent and analyze sequences and series: Explicit formulas for nth terms
Chemistry (pgs. 25-41)	NJ	MA.12.4.3.12 A.1.2	Use models and algebraic formulas to represent and analyze sequences and series: Sums of finite arithmetic series
Chemistry (pgs. 25-41)	NJ	MA.12.4.3.12 A.1.3	Use models and algebraic formulas to represent and analyze sequences and series: Sums of finite and infinite geometric series
Chemistry (pgs. 25-41)	NJ	MA.12.4.5 E.1.3	Create and use representations to organize, record, and communicate mathematical ideas: Symbolic representations (e.g., a formula)
Physics and Math (pgs. 43-63)	NJ	MA.12.4.3.12 A.1.1	Use models and algebraic formulas to represent and analyze sequences and series: Explicit formulas for nth terms
Physics and Math (pgs. 43-63)	NJ	MA.12.4.3.12 A.1.2	Use models and algebraic formulas to represent and analyze sequences and series: Sums of finite arithmetic series

Physics and Math (pgs. 43-63)	NJ	MA.12.4.3.12 A.1.3	Use models and algebraic formulas to represent and analyze sequences and series: Sums of finite and infinite geometric series
Physics and Math (pgs. 43-63)	NJ	MA.12.4.3.12 B.1	Understand relations and functions and select, convert flexibly among, and use various representations for them, including equations or inequalities, tables, and graphs.
Physics and Math (pgs. 43-63)	NJ	MA.12.4.3.12 B.2.9	Analyze and explain the general properties and behavior of functions such as rates of change
Physics and Math (pgs. 43-63)	NJ	MA.12.4.5 E.1.3	Create and use representations to organize, record, and communicate mathematical ideas: Symbolic representations (e.g., a formula)
Rocket Activity (pgs. 69-75)	NJ	MA.12.4.3.12 A.1.1	Use models and algebraic formulas to represent and analyze sequences and series: Explicit formulas for nth terms
Rocket Activity (pgs. 69-75)	NJ	MA.12.4.3.12 A.1.2	Use models and algebraic formulas to represent and analyze sequences and series: Sums of finite arithmetic series
Rocket Activity (pgs. 69-75)	NJ	MA.12.4.3.12 A.1.3	Use models and algebraic formulas to represent and analyze sequences and series: Sums of finite and infinite geometric series
Rocket Activity (pgs. 69-75)	NJ	MA.12.4.5 E.1.3	Create and use representations to organize, record, and communicate mathematical ideas: Symbolic representations (e.g., a formula)